# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

**2102-F-21-R-43**

**Name**: Lake Hanson **County**: Hanson
**Legal Description**: T102-R58-Sec. 21
**Location from nearest town**: 2 miles south of Alexandria, SD

**Dates of present survey**: August 9-10, 2010
**Date last surveyed**: August 11-12, 2008

| Managed Species | Other Species |
|---|---|
| Largemouth Bass | Walleye |
| Bluegill | Channel Catfish |
| White Crappie | Black Bullhead |
| Black Crappie | Hybrid Sunfish |

## PHYSICAL DATA

**Surface Area**: 55 acres **Watershed area**: 40,053 acres
**Maximum depth**: 17 feet **Mean depth**: 8 feet
**Volume**: 418 acre-feet **Shoreline length**: 2.2 miles
**Contour map available**: yes **Date mapped**: 1970
**Lake elevation observed during the survey**: Full
**Beneficial use classifications**: (5) warmwater semipermanent fish propagation, (7) immersion recreation, (8) limited-contact recreation and (9) fish and wildlife propagation and stock watering.

### Introduction

Lake Hanson is an artificial impoundment constructed by the Works Progress Administration (WPA) in 1934. It was named by a local lake committee in honor of the county.

### Ownership of the Lake and Adjacent Lakeshore Property

The dam impounding Lake Hanson is owned by the South Dakota Department of School and Public Lands and the South Dakota Department of Game, Fish, and Parks (GFP) is responsible for managing the fishery. The land surrounding Lake Hanson is privately owned. However, two easements created in 1934 grant public access to a strip of land lying 12 feet above the ordinary high water mark around the entire lake.

### Fishing Access

There is a concrete-plank boat ramp owned by Hanson County on the north side of the lake capable of handling most boats. Shore fishing is available at various sites along the north shore.

**Field Observations of Water Quality and Aquatic Vegetation**

Water clarity at the time of the survey was good with a Secchi depth measurement of 86 cm (34 in). Common cattail (*Typha spp.*) was found around most of the south shoreline and sparse beds of sago pondweed (*Potamogeton pectinatus*) and coontail (*Ceratophyllum demersum*) were also observed.

# BIOLOGICAL DATA

**Methods:**

Lake Hanson was sampled on August 9-10, 2010 with four overnight trap-net sets. The trap nets are constructed with 19-mm-bar-mesh (¾ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. Sampling locations are displayed in Figure 5.

**Results and Discussion:**

## Trap Net Catch

Black bullhead (54.7%), white crappie (23.2%), and black crappie (13.1%) comprised the majority of the trap net catch (Table 1). Other species sampled included bluegill, northern pike, common carp, yellow perch, and channel catfish.

**Table 1.** Total catch from four overnight trap net sets at Lake Hanson, Hanson County August 9-10, 2010.

| Species | Number | Percent | CPUE[1] | 80% C.I. | Mean CPUE* | PSD | RSD-P | Mean Wr |
|---|---|---|---|---|---|---|---|---|
| **Black Bullhead** | 233 | 54.7 | 46.6 | ±21.3 | 0.3 | 12 | 0 | 71 |
| **White Crappie** | 99 | 23.2 | 19.8 | ±9.7 | 9.0 | 16 | 14 | 85 |
| **Black Crappie** | 56 | 13.1 | 11.2 | ±5.7 | 40.7 | 38 | 29 | 92 |
| **Bluegill** | 25 | 5.9 | 5.0 | ±2.1 | 34.6 | 40 | 0 | 91 |
| **Northern Pike** | 5 | 1.2 | 1.0 | ±1.0 | 1.7 | -- | -- | -- |
| **Common Carp** | 4 | 0.9 | 0.8 | ±0.7 | 0.4 | -- | -- | -- |
| **Yellow Perch** | 3 | 0.7 | 0.6 | ±0.5 | 9.6 | -- | -- | -- |
| **Channel Catfish** | 1 | 0.2 | 0.2 | ±0.3 | 0.3 | -- | -- | -- |

* 4 years (2002, 2004, 2006, 2008)

[1] See Appendix A for definitions of CPUE, PSD, RSD-P and mean Wr.

**Table 2**. Catch per unit effort by length category for various fish species captured with trap nets in Lake Hanson August 9-10, 2010.

| Species | Substock | Stock | S-Q | Q-P | P+ | All sizes | 80% C.I. |
|---|---|---|---|---|---|---|---|
| **Black Bullhead** | 8.2 | 38.4 | 33.8 | 4.6 | -- | 46.6 | ±21.3 |
| **White Crappie** | 2.6 | 17.2 | 14.4 | 0.4 | 2.4 | 19.8 | ±9.7 |
| **Black Crappie** | 6.4 | 4.8 | 3.0 | 0.4 | 1.4 | 11.2 | ±5.7 |
| **Bluegill** | -- | 5.0 | 3.0 | 2.0 | -- | 5.0 | ±2.1 |
| **Northern Pike** | -- | 1.0 | 0.4 | 0.6 | -- | 1.0 | ±1.0 |
| **Common Carp** | -- | 0.8 | 0.2 | 0.6 | -- | 0.8 | ±0.7 |
| **Yellow Perch** | 0.2 | 0.4 | 0.4 | -- | -- | 0.6 | ±0.5 |
| **Channel Catfish** | -- | 0.2 | -- | -- | 0.2 | 0.2 | ±0.3 |

Length categories can be found in Appendix A.

## Bluegill

**Management objective:** Maintain a bluegill fishery with a trap net CPUE of at least 20 and RSD-18 of at least 20 in three out of five lake surveys.

Bluegill trap-net CPUE decreased dramatically in 2008 indicating a significant portion of the population may have washed downstream following the dam breach in 2007 (Table 3). The sampled bluegills range in length from 10 - 18 cm (3.9-7.1 in) (Figure 1) which is similar to previous years. Lake Hanson was stocked with 22,900 bluegill fingerlings in 2008 to help rebuild the population (Table 7), but CPUE has only increased slightly.

**Table 3.** Bluegill trap-net CPUE, PSD, RSD-18, RSD-P, and mean Wr for Lake Hanson, Hanson County, 2002-2010.

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| CPUE | 8.9 | | 89.6 | | 36.6 | | 3.3 | | 5.0 |
| PSD | 64 | | 12 | | 45 | | 54 | | 40 |
| RSD-18 | 18 | | 2 | | 16 | | 0 | | 8 |
| RSD-P | 6 | | 1 | | 12 | | 0 | | 0 |
| Mean Wr | 112 | | 88 | | 96 | | 95 | | 91 |

## White Crappie

**Management objective:** Maintain a crappie fishery with a trap net CPUE of at least 20 and PSD of at least 40 in three out of five lake surveys.

White crappie CPUE increased to 19.8 this year (Table 4). Crappie abundance over the past ten years has varied widely and is somewhat cyclic. The fish sampled during this year's survey ranged in length from 110-330 mm (4.3-13.0 in) (Figure 2).

**Table 4.** White crappie trap-net CPUE, PSD, RSD-P, and mean Wr for Lake Hanson, Hanson County, 2002-2010.

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| CPUE | 4.3 | | 27.2 | | 2.4 | | 2.0 | | 19.8 |
| PSD | 98 | | 19 | | 68 | | -- | | 16 |
| RSD-P | 37 | | 4 | | 64 | | -- | | 14 |
| Mean Wr | 106 | | 87 | | 89 | | -- | | 85 |

## Black Crappie

**Management objective:** Maintain a crappie fishery with a trap net CPUE of at least 20 and PSD of at least 40 in three out of five lake surveys.

Black crappie CPUE has also increased since the dam breach in 2007 (Table 5). Size structure and condition of the black crappie population was better than the white crappie population (Table 5 and Figure 3).

**Table 5.** Black crappie trap-net CPUE, PSD, RSD-P, and mean Wr for Lake Hanson, Hanson County, 2002-2010.

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| CPUE | 16.7 | | 66.0 | | 74.2 | | 5.8 | | 11.2 |
| PSD | 95 | | 4 | | 14 | | 100 | | 38 |
| RSD-P | 9 | | 0 | | 5 | | 55 | | 29 |
| Mean Wr | 105 | | 111 | | 99 | | 107 | | 92 |

## All Species

Black bullheads were again sampled in 2010 after being absent from the preceding two surveys (Table 6). They are now the most abundant species in the survey.

**Table 6.** Trap-net CPUE for all fish species sampled in Lake Hanson, Hanson County, 2002-2010.

| Species | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| **COC** | -- | | -- | | 0.1 | | 1.5 | | 0.8 |
| **BLB** | 0.6 | | 0.4 | | -- | | -- | | 46.6 |
| **CCF** | -- | | -- | | 0.8 | | 0.5 | | 0.2 |
| **NOP** | 0.8 | | 0.4 | | 0.4 | | 5.0 | | 1.0 |
| **HYB** | 0.1 | | -- | | -- | | -- | | -- |
| **BLG** | 8.9 | | 89.6 | | 36.6 | | 3.3 | | 5.0 |
| **LMB** | -- | | 0.2 | | -- | | 0.3 | | -- |
| **WHC** | 4.3 | | 27.2 | | 2.4 | | 2.0 | | 19.8 |
| **BLC** | 16.7 | | 66.0 | | 74.2 | | 5.8 | | 11.2 |
| **YEP** | 0.7 | | 1.2 | | 35.9 | | 0.5 | | 0.6 |
| **WAE** | 0.7 | | -- | | -- | | -- | | -- |

CCF (Channel Catfish), LMB (Largemouth Bass), NOP (Northern Pike), SXW (Saugeye), WAE (Walleye), BLC (Black Crappie), BLG (Bluegill), GSF (Green Sunfish), HYB (Hybrid Sunfish), WHC (White Crappie), YEP (Yellow Perch), BLB (Black Bullhead), COC (Common Carp),

# MANAGEMENT RECOMMENDATIONS

1. Stock crappies, bluegills and largemouth bass as needed to accomplish management objectives.

2. Monitor the fishery by conducting an all-species electrofishing survey every other year.

**Table 7.** Stocking record for Lake Hanson, Hanson County, 1991-2010.

| Year | Number | Species | Size |
|---|---|---|---|
| 1991 | 3,100 | Largemouth Bass | Fingerling |
| 1996 | 1,336 | Walleye | Lrg. Fingerling |
| 1997 | 1,375 | Saugeye | Fingerling |
| | 1,375 | Walleye | Fingerling |
| 1998 | 801 | Saugeye | Fingerling |
| | 1,335 | Walleye | Fingerling |
| 1999 | 637 | Saugeye | Lrg. Fingerling |
| | 1,375 | Walleye | Fingerling |
| 2002 | 2,000 | Largemouth Bass | Fingerling |
| 2008 | 22,900 | Bluegill | Fingerling |
| | 6,560 | Largemouth Bass | Fingerling |

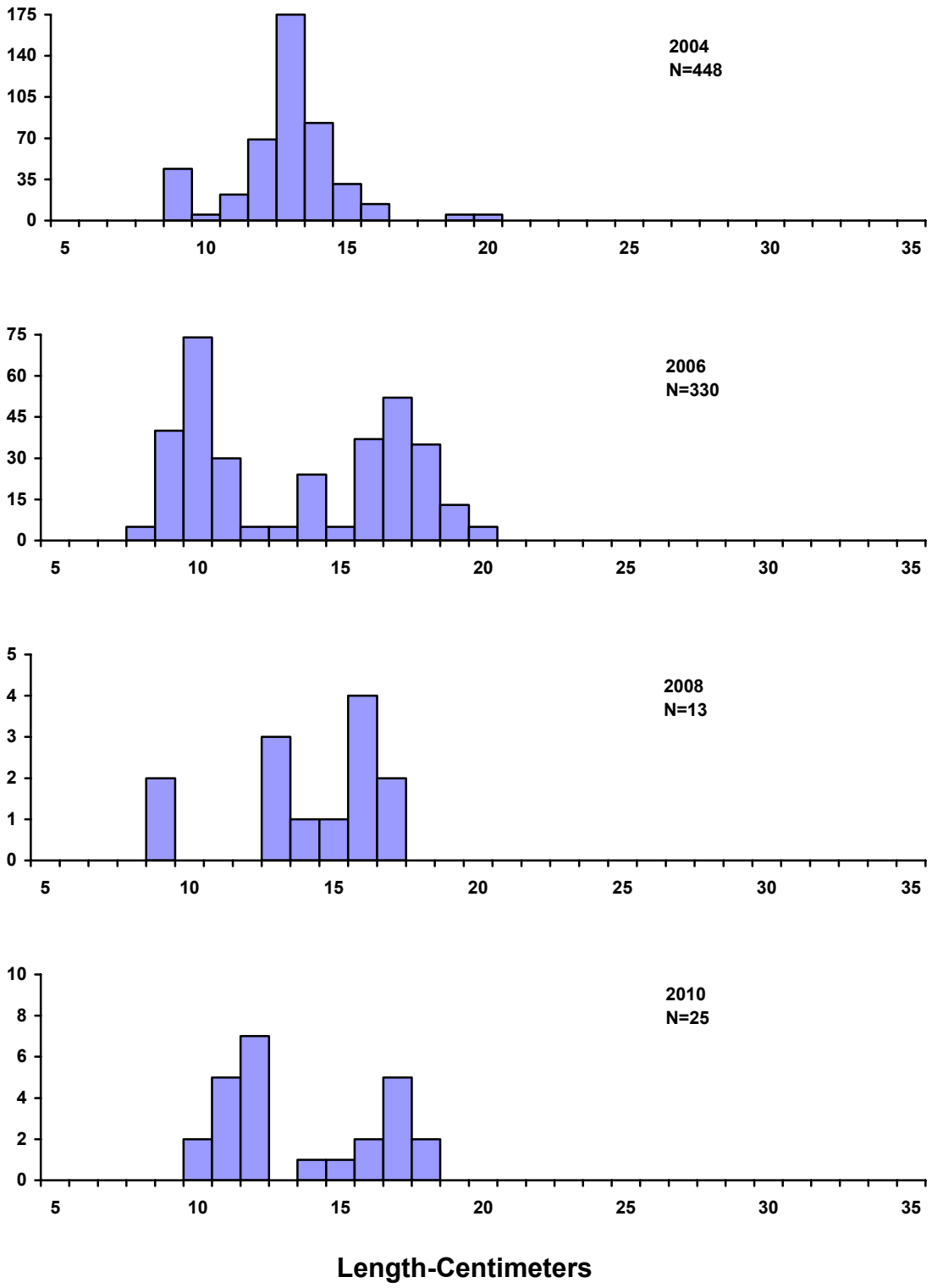



**Figure 1.** Length frequency histograms for bluegills sampled with trap nets in Lake, Hanson, Hanson County, 2004, 2006, 2008, 2010.

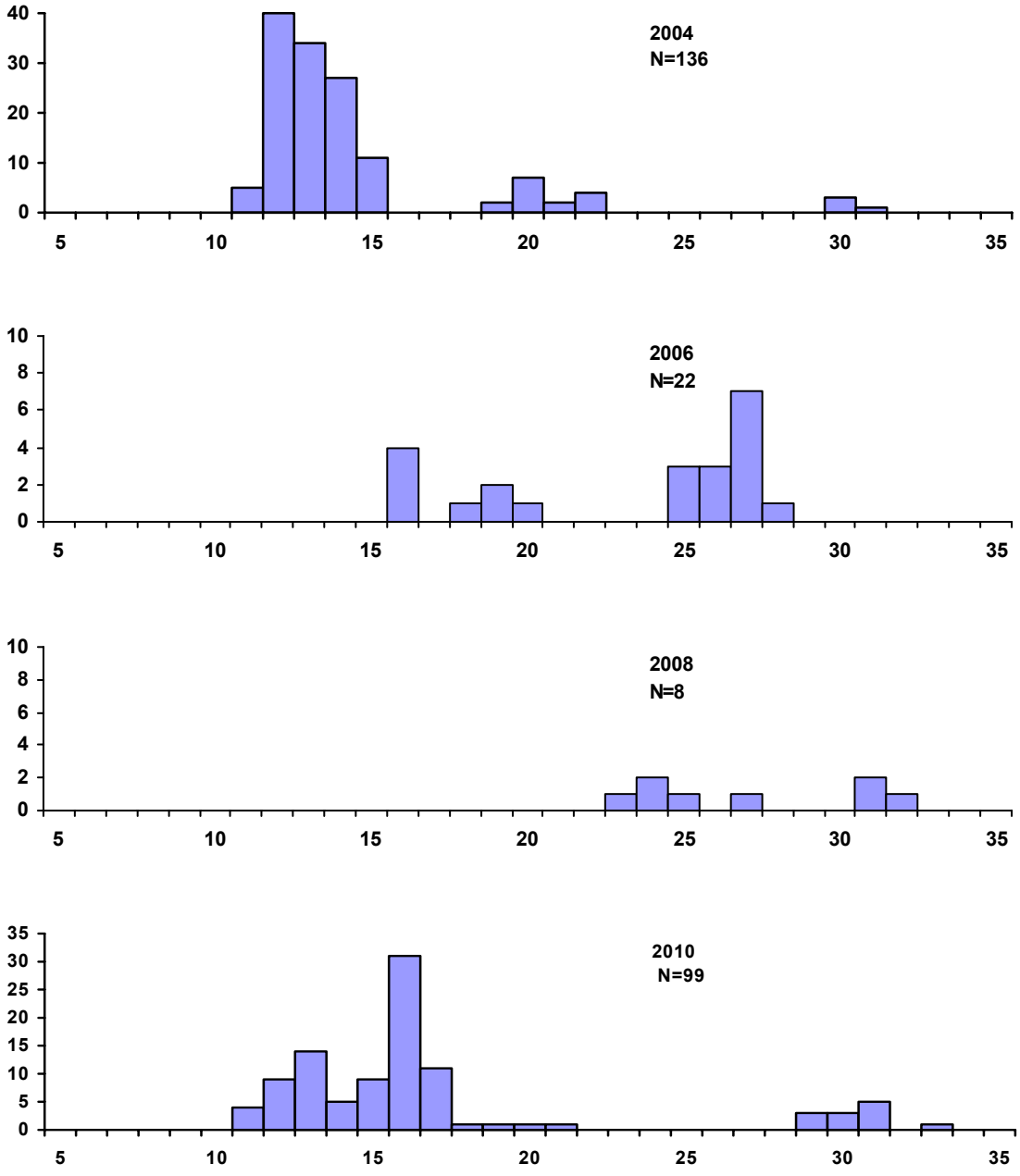



**Figure 2.** Length frequency histograms for white crappies sampled with trap nets in Lake, Hanson, Hanson County, 2004, 2006, 2008, 2010.

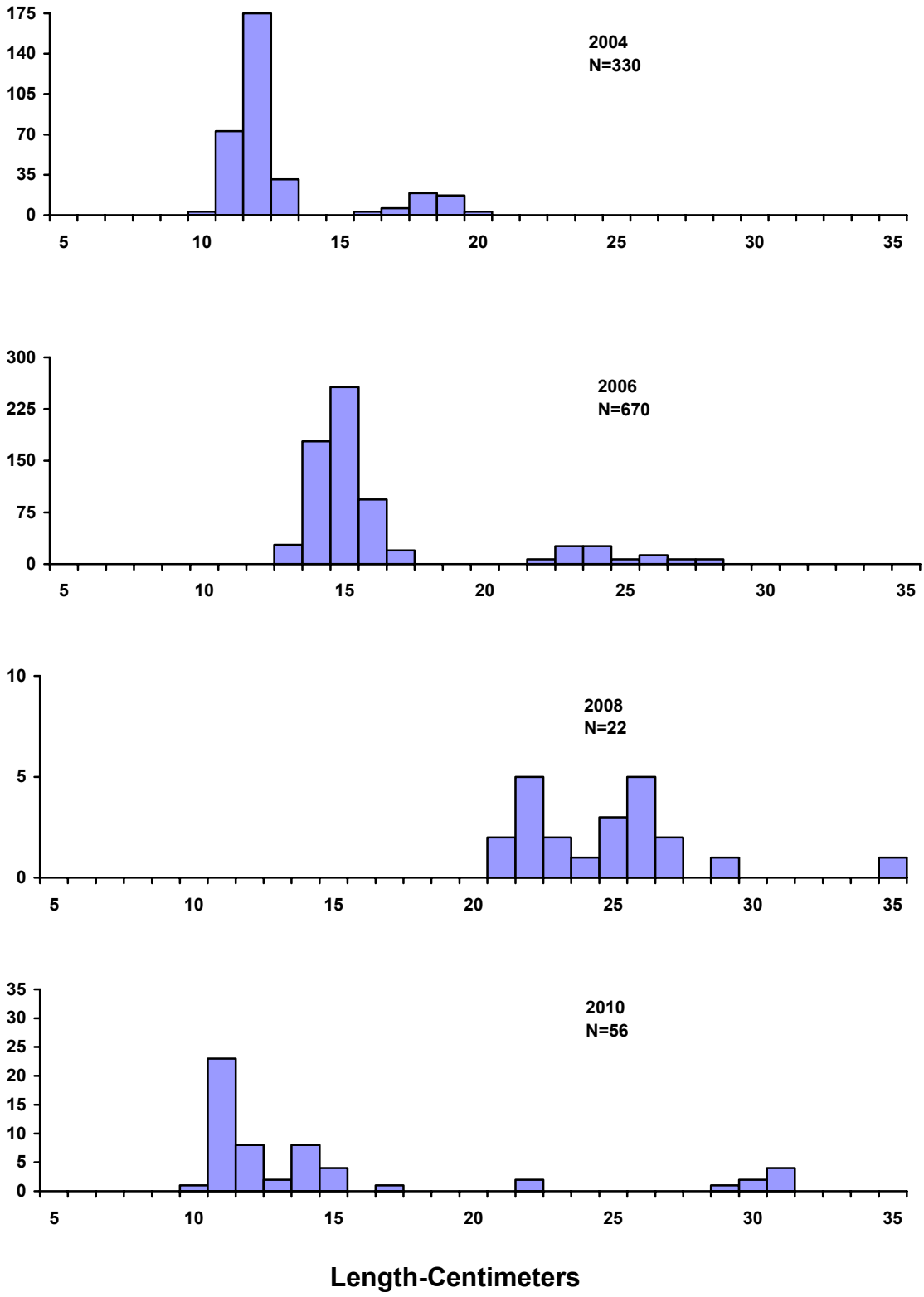
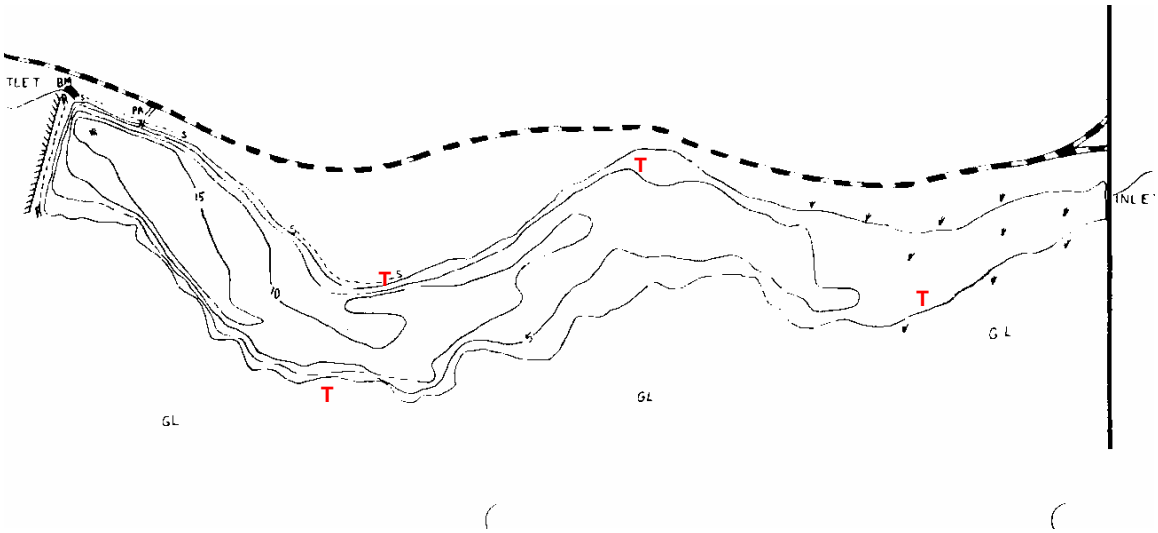



**Figure 3.** Length frequency histograms for black crappies sampled with trap nets in Lake, Hanson, Hanson County, 2004, 2006, 2008, 2010.




**Legend**

Trap Net Sites: T

**Figure 4.** Sampling locations on Lake Hanson, Hanson County, 2010.

**Appendix A.** A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

**Catch Per Unit Effort (CPUE)** is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

**Proportional Stock Density (PSD)** is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

**Relative Stock Density (RSD-P)** is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters. (inches in parenthesis).

| Species | Stock | Quality | Preferred | Memorable | Trophy |
|---|---|---|---|---|---|
| Walleye | 25 (10) | 38 (15) | 51 (20) | 63 (25) | 76 (30) |
| Yellow perch | 13 (5) | 20 (8) | 25 (10) | 30 (12) | 38 (15) |
| Black crappie | 13 (5) | 20 (8) | 25(10) | 30 (12) | 38 (15) |
| White crappie | 13 (5) | 20 (8) | 25(10) | 30 (12) | 38 (15) |
| Bluegill | 8 (3) | 15 (6) | 20 (8) | 25 (10) | 30 (12) |
| Largemouth bass | 20 (8) | 30 (12) | 38 (15) | 51 (20) | 63 (25) |
| Smallmouth bass | 18 (7) | 28 (11) | 35(14) | 43 (17) | 51 (20) |
| Northern pike | 35 (14) | 53 (21) | 71 (28) | 86 (34) | 112 (44) |
| Channel catfish | 28 (11) | 41 (16) | 61 (24) | 71 (28) | 91 (36) |
| Black bullhead | 15 (6) | 23 (9) | 30 (12) | 38 (15) | 46 (18) |
| Common carp | 28 (11) | 41 (16) | 53 (21) | 66 (26) | 84 (33) |
| Bigmouth buffalo | 28 (11) | 41 (16) | 53 (21) | 66 (26) | 84 (33) |

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

**Relative weight (Wr)** is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.